OPEN SYSTEMS

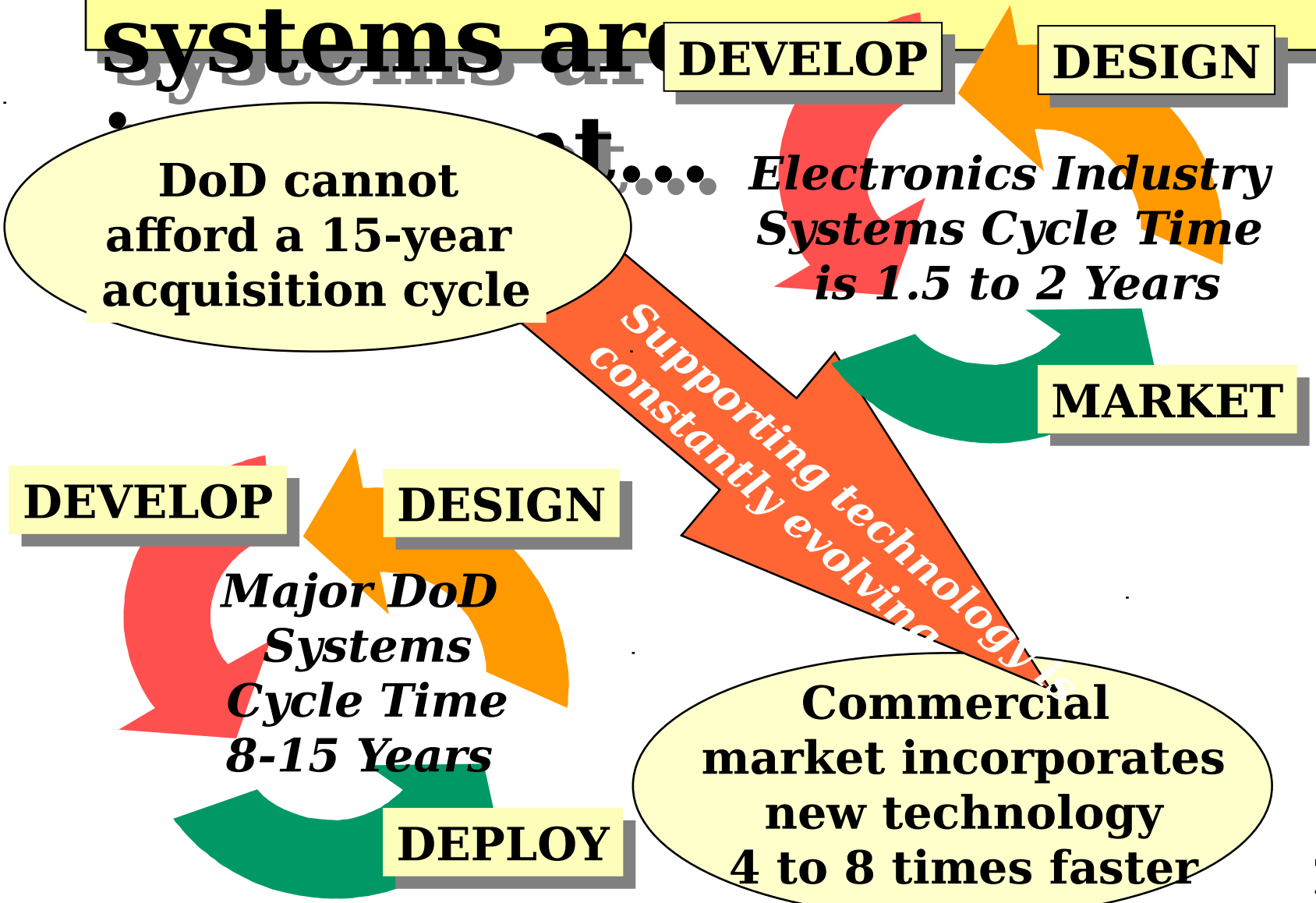
(System Level)

"Definitions, Underlying Concepts" & DCMC Mission

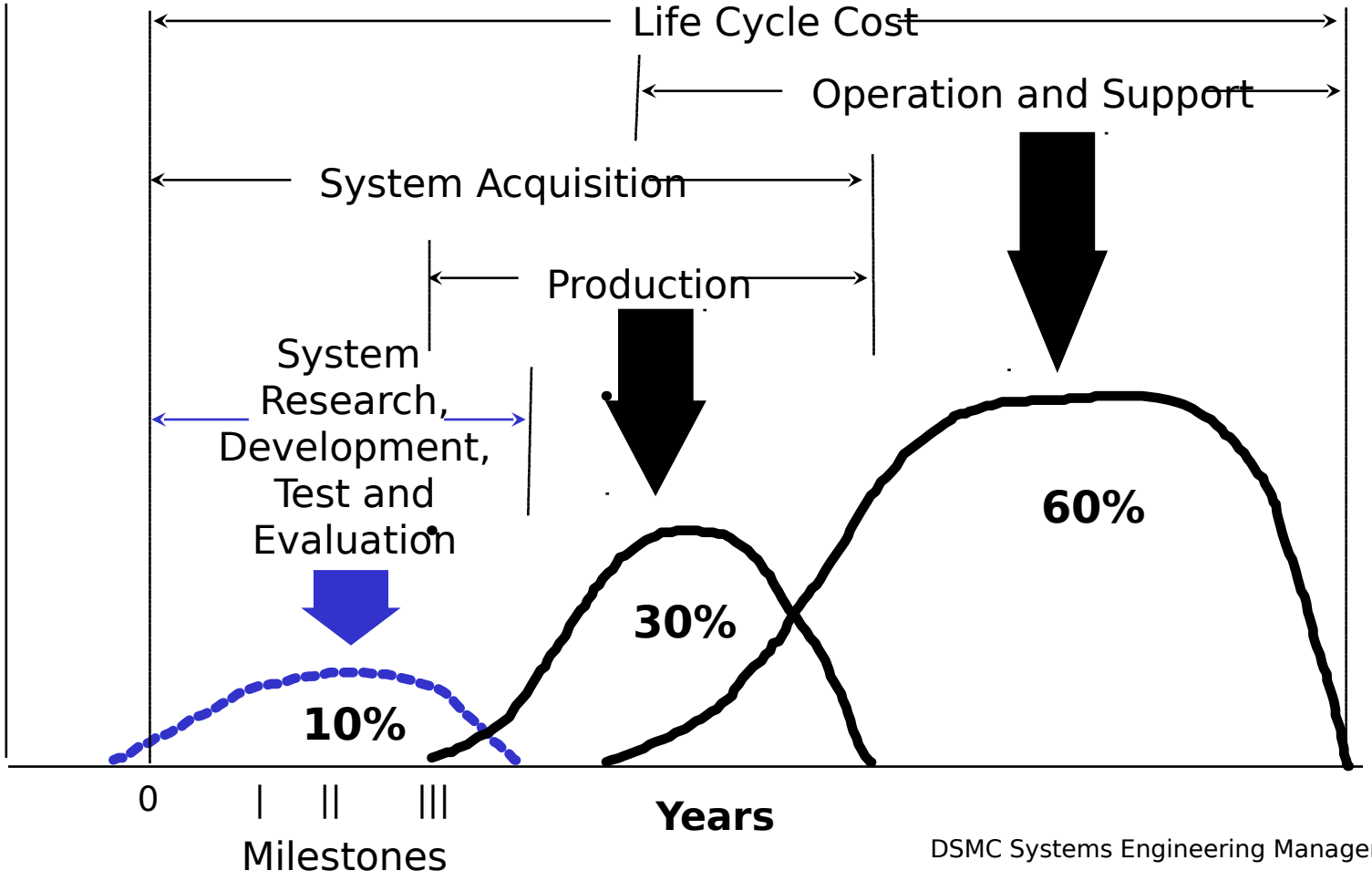
Http://www.acq.osd.mil/osjtf

Based upon Documents By
Colonel J. Michael Hanratty
OPEN SYSTEMS - JOINT TASK FORCE

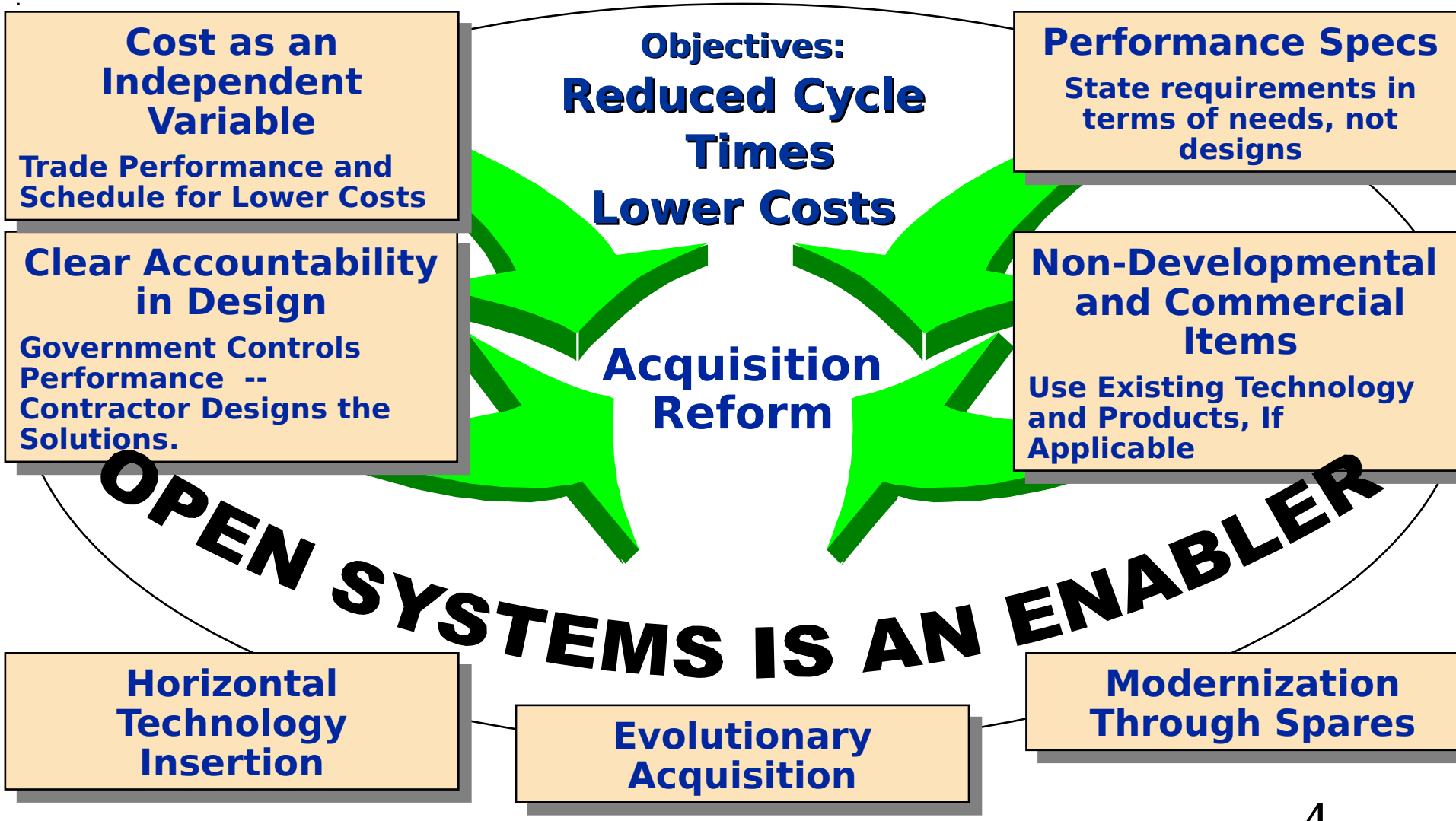
Here's why open systems ar… …t…


DEVELOP
DESIGN
DoD cannot afford a 15-year acquisition cycle
Electronics Industry Systems Cycle Time is 1.5 to 2 Years
MARKET
Supporting technology is constantly evolving
DEVELOP
DESIGN
Major DoD Systems Cycle Time 8-15 Years
DEPLOY
Commercial market incorporates new technology 4 to 8 times faster

Majority of Life Cycle Costs in Production and O&S



Open Systems & Acquisition Reform

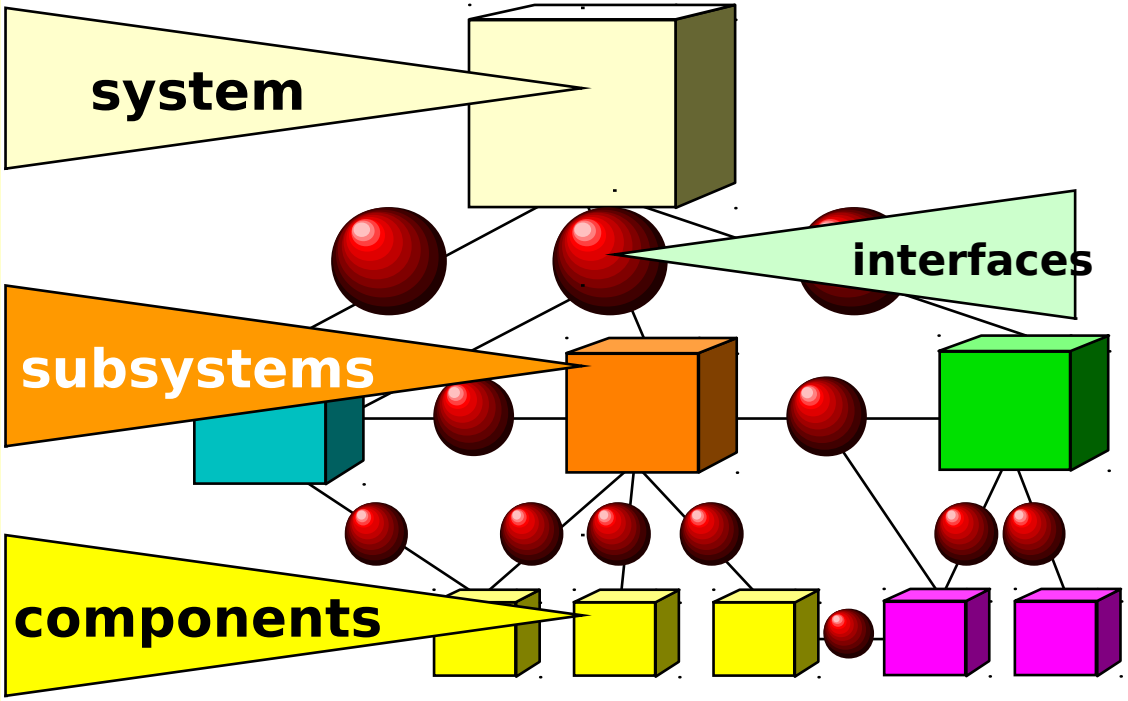

Cost as an Independent Variable
Trade Performance and Schedule for Lower Costs
Clear Accountability in Design
Government Controls Performance -- Contractor Designs the Solutions.
Objectives:
Reduced Cycle Times
Lower Costs
Acquisition Reform
Performance Specs
State requirements in terms of needs, not designs
Non-Developmental and Commercial Items
Use Existing Technology and Products, If Applicable
OPEN SYSTEMS IS AN ENABLER
Horizontal Technology Insertion
Evolutionary Acquisition
Modernization Through Spares

Definitions

A **system** -
is a collection of interacting...

...**subsystems** -
which are collections of interacting...

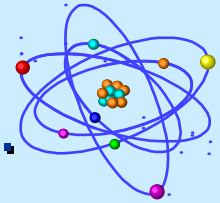
...**components** -
either hardware, software, or human, ...

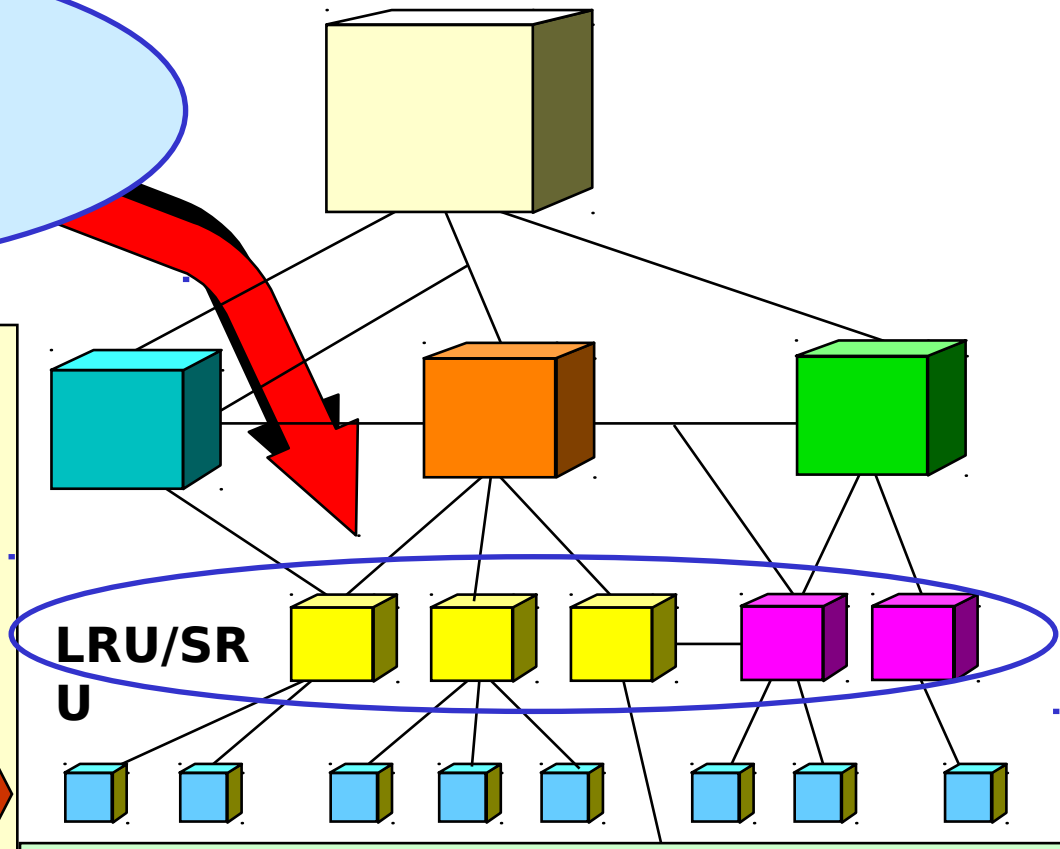


...that are connected by **interfaces** -
to support the interchange of information, activity, or material essential to the functioning of the system.

Open Systems Concept - Atomic Level

ATOMIC LEVEL …





- **Producer controls design, interfaces and implementation**
- **No further interface or functional definition by User**
- **Expect no repair by User**
- **Level may change over time**

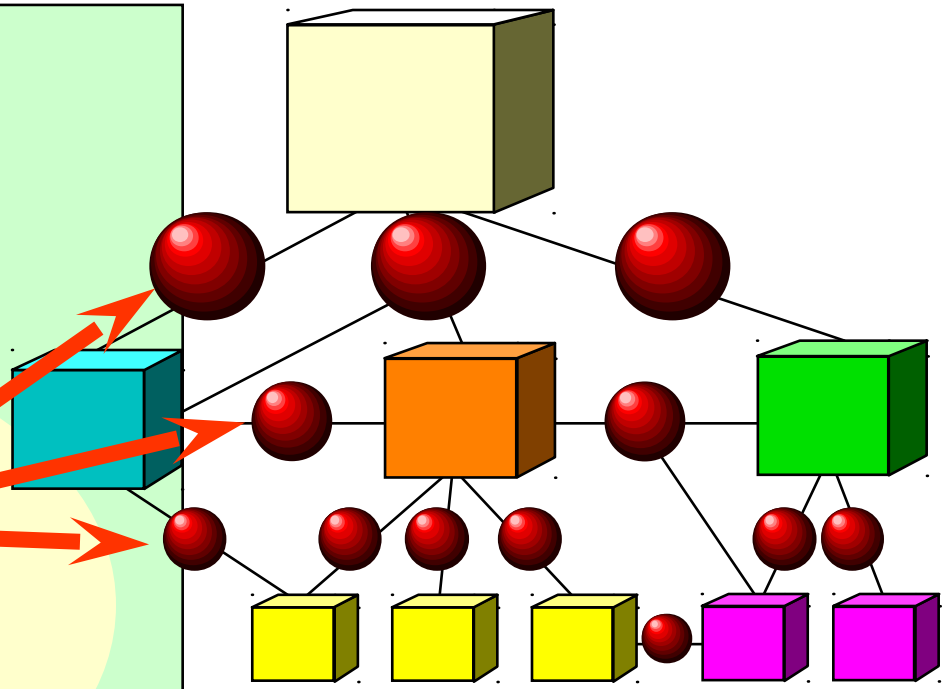
Define for each system, based on planned repair and support levels.

The Open Systems Concept

Open Systems is all about managing **interfaces!**

DoD focus is on the **Interfaces**

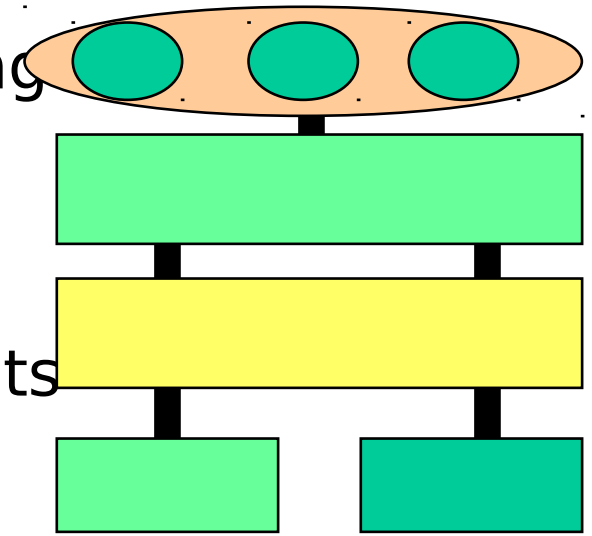
Producers choose the **Implementations**



What is a Reference Model

Abstract Framework to …

- Promote common understanding
- Identify critical interfaces
- Apply standards
- Determine an atomic level
- Incorporate planned components



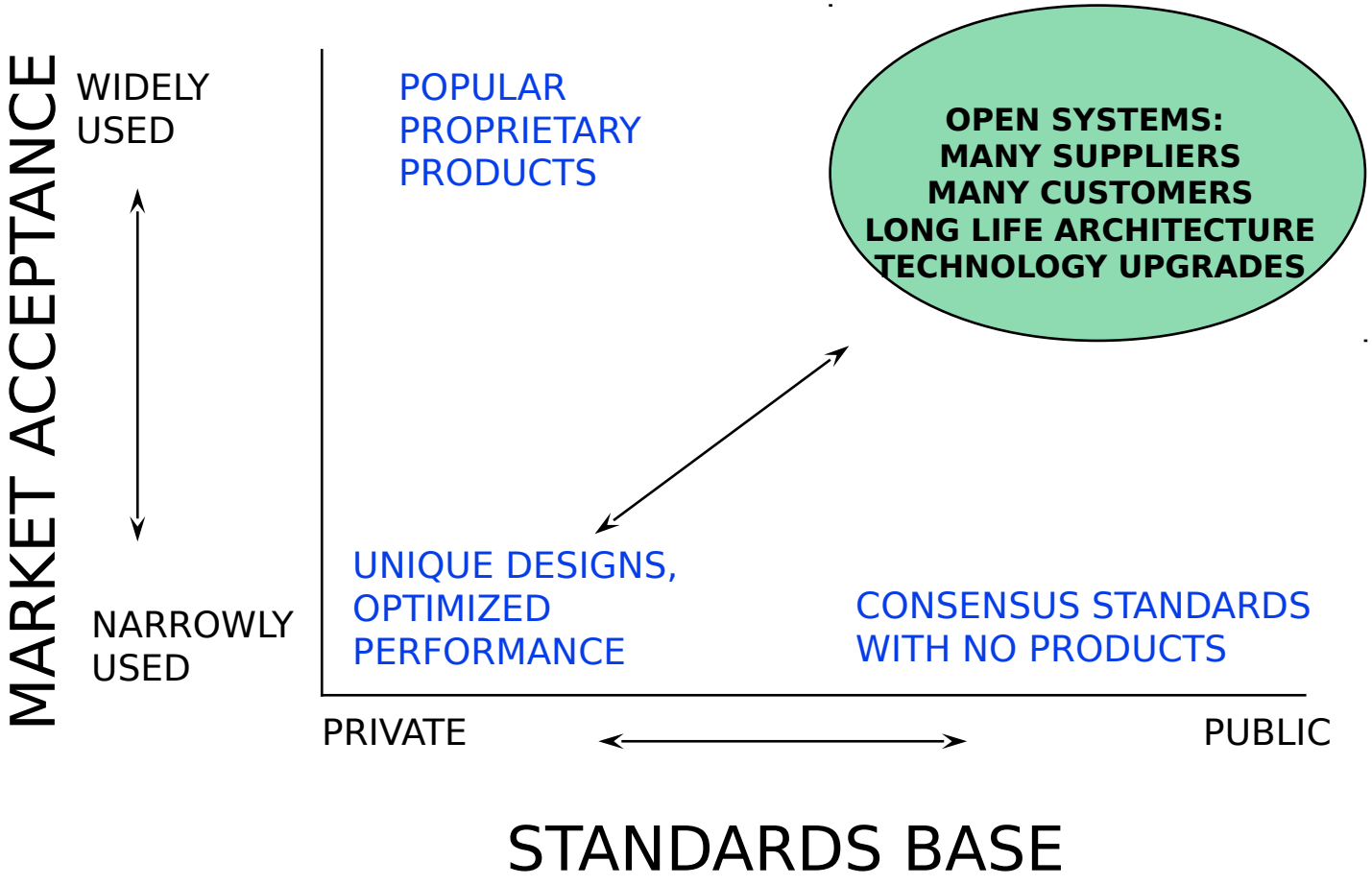
Represents types and kinds of

- functions, interfaces and features

to be addressed by the type of system.

The Reference Model is not a Product or System Description!

Move To Open Systems



Definition of Open Systems

"A system that implements sufficient open specifications for interfaces, services and supporting formats to enable properly engineered components to be utilized across a wide range of systems with minimal changes,..."

DOD 5000.2-R

Definition of Open Systems

"An open system is characterized by the following:

-Well defined , widely used, preferably non-proprietary interfaces/protocols and

-Use of standards which are developed/adopted by recognized standards bodies or the commercial market place, and

-Definition of all aspects of system interfaces to facilitate new or additional systems capabilities for a wide range of applications, and

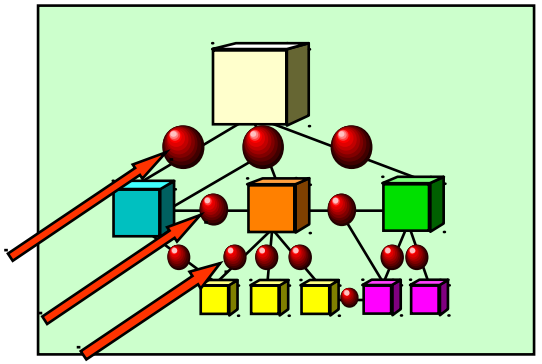
-Explicit provision for expansion or upgrade through the incorporation of additional or higher performance elements with minimal impact on the system."

What is an Open Systems Approach?

- An integrated technical & business strategy
- Modular design of hardware and software
- Applying commercial, widely used interface standards in weapon systems
- To buy rather than develop system components

Open Systems Principles

- **Systems should be designed using a standards-based architecture**
  - Reference Model
  - Rules

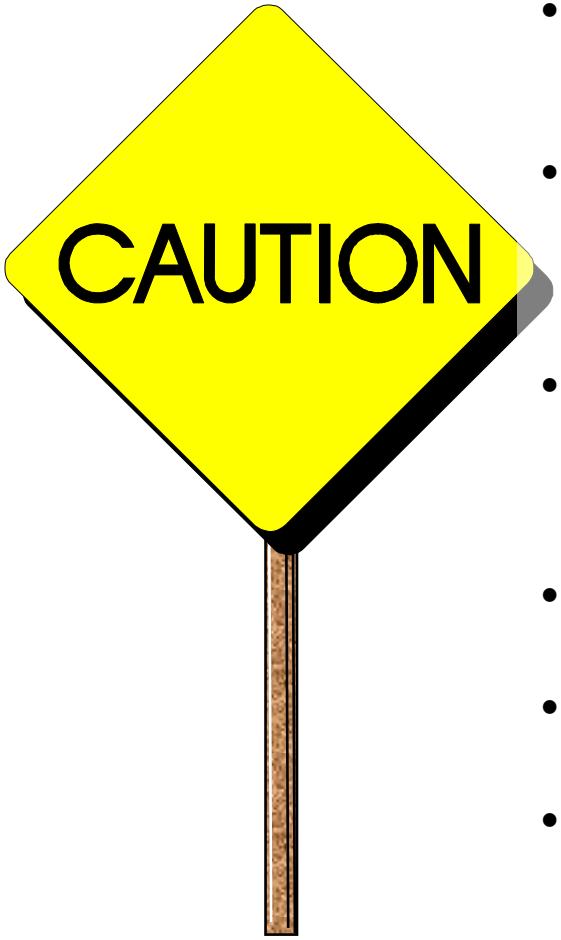


Use standards to define interfaces

Open Systems - Systems Engineering Process

- Engineering for open systems focuses on **interface management**
- Design emphasizes the selection of interfaces which
  - **considers life cycle support requirements**
  - **permits evolution with advances in technology**
  - **anticipates technology obsolescence**
  - **supports technology insertion**

Possible Risks



- **Government becomes a consumer instead of the designer - less control over outcomes**
- **Open Systems may not provide the optimum design for modules, components, subsystems and short-term solutions**
- **Building Open Systems takes time for**
  - **Market analysis**
  - **Prototyping**
  - **Standards Selection**
- **The standards selection process has risks**
- **Open Interface *extensions* may cause problems later in the life cycle**
- **Supportability Risks**

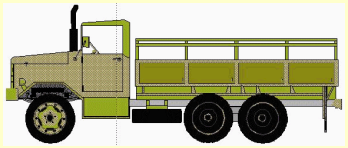
FOR LEGACY SYSTEMS …

When? Apply open systems when working changes (ECPs)

How? Adapt non-conforming components into the architecture as program matures - allowing modernization through spares

Why? Apply the concept of ***Flexible Sustainment***

To drive lower life cycle costs,
Using F³I and Interface management instead of
Technical Data Packages to insert new technology,
And improve reliability and performance



Open Systems (System Level)

- DCMC Engineering Role
  - Review contracts for Open System requirements
  - Review ECPs for Open System consideration
  - Ensure contractor policies address Open Systems
  - Ensure contractor has capability to implement Open Systems
  - Ensure the contractor has an Open Systems process.